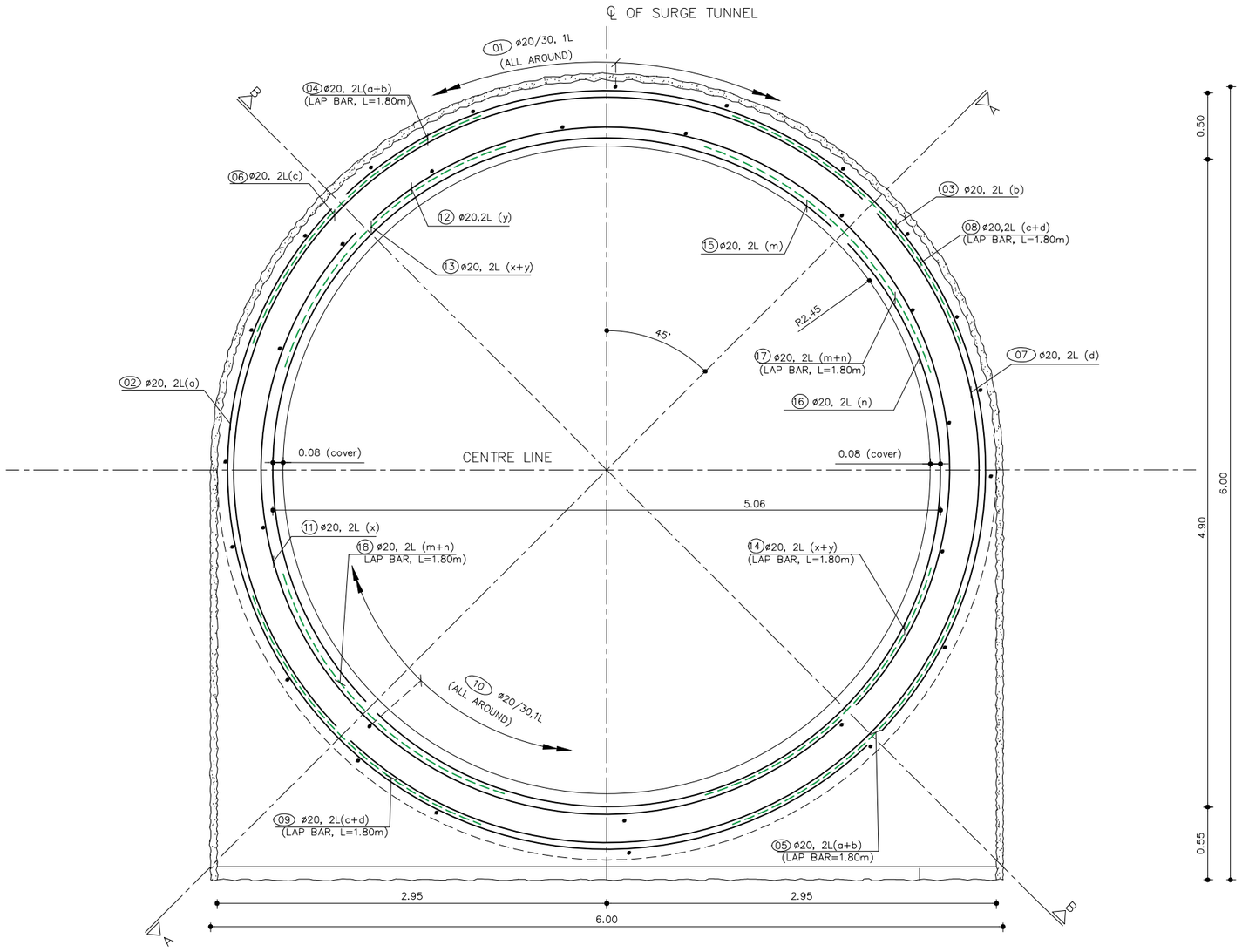
NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

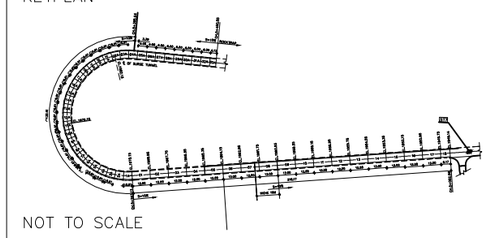
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 24A
SCALE 1:20

SCALE 1:20
-0.20 0 0.20 0.40 0.60 0.80 1.00 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

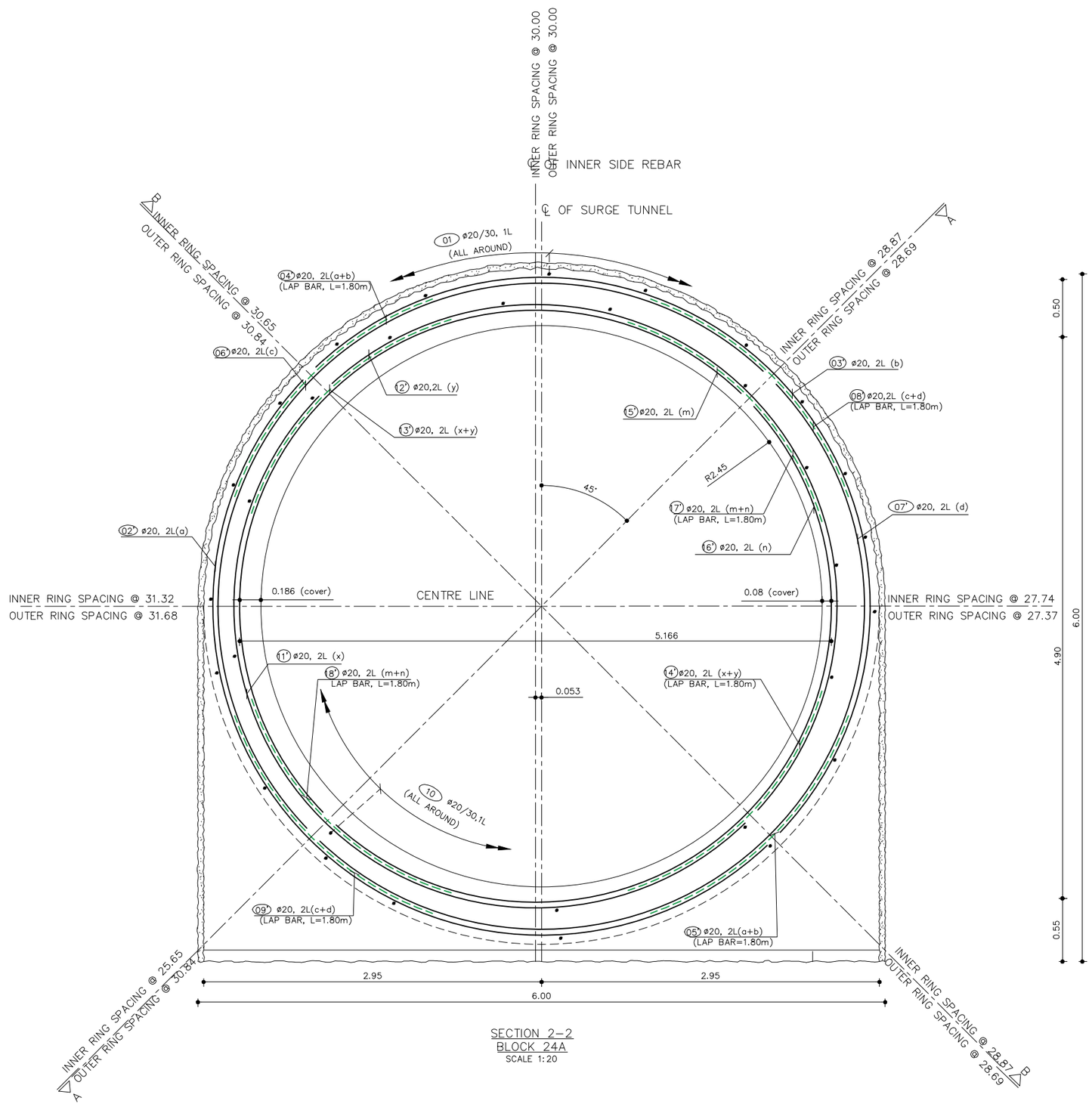
	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 24A
CH.0+392.16~CH.0+397.93
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40
Drwg. No.: UTK-032064-ST-CL- R-2401 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
—//—//— Construction Joint
——■—— Coupler



SECTION 2-2
BLOCK 24A
SCALE 1:20

SCALE 1:20
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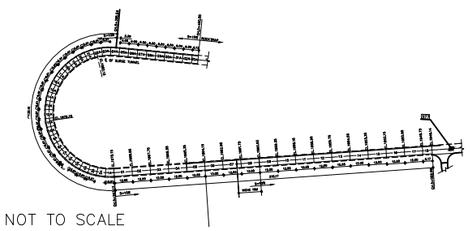
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

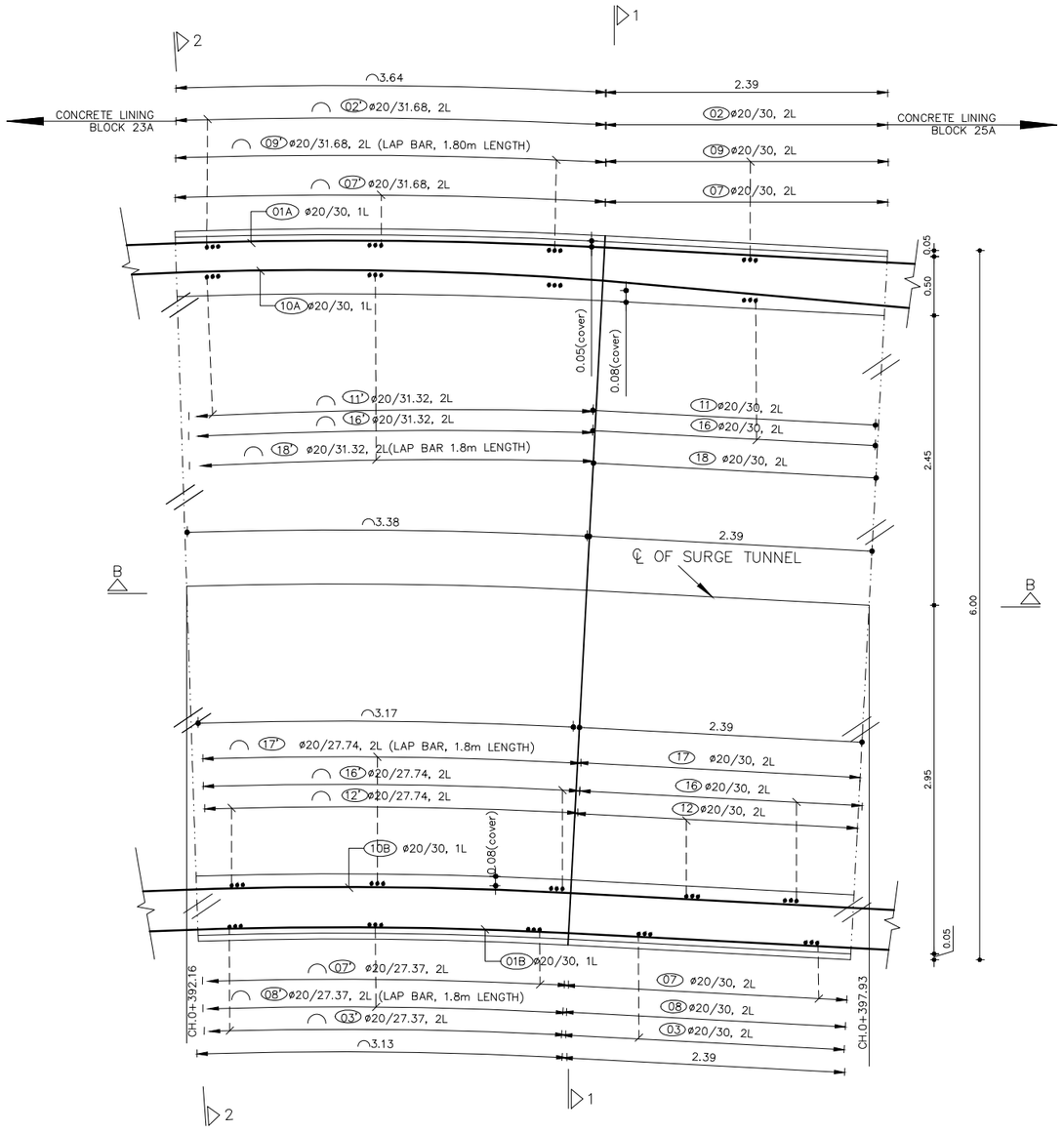
SURGE TUNNEL
CONCRETE LINING
BLOCK 24A
CH.0+392.16~CH.0+397.93
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-2402 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

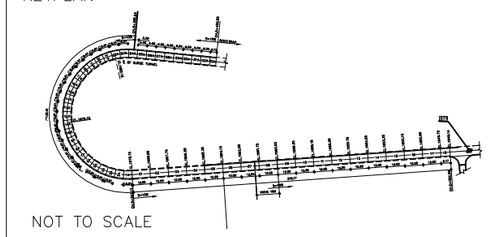
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION A-A
BLOCK 24A
SCALE 1:25

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

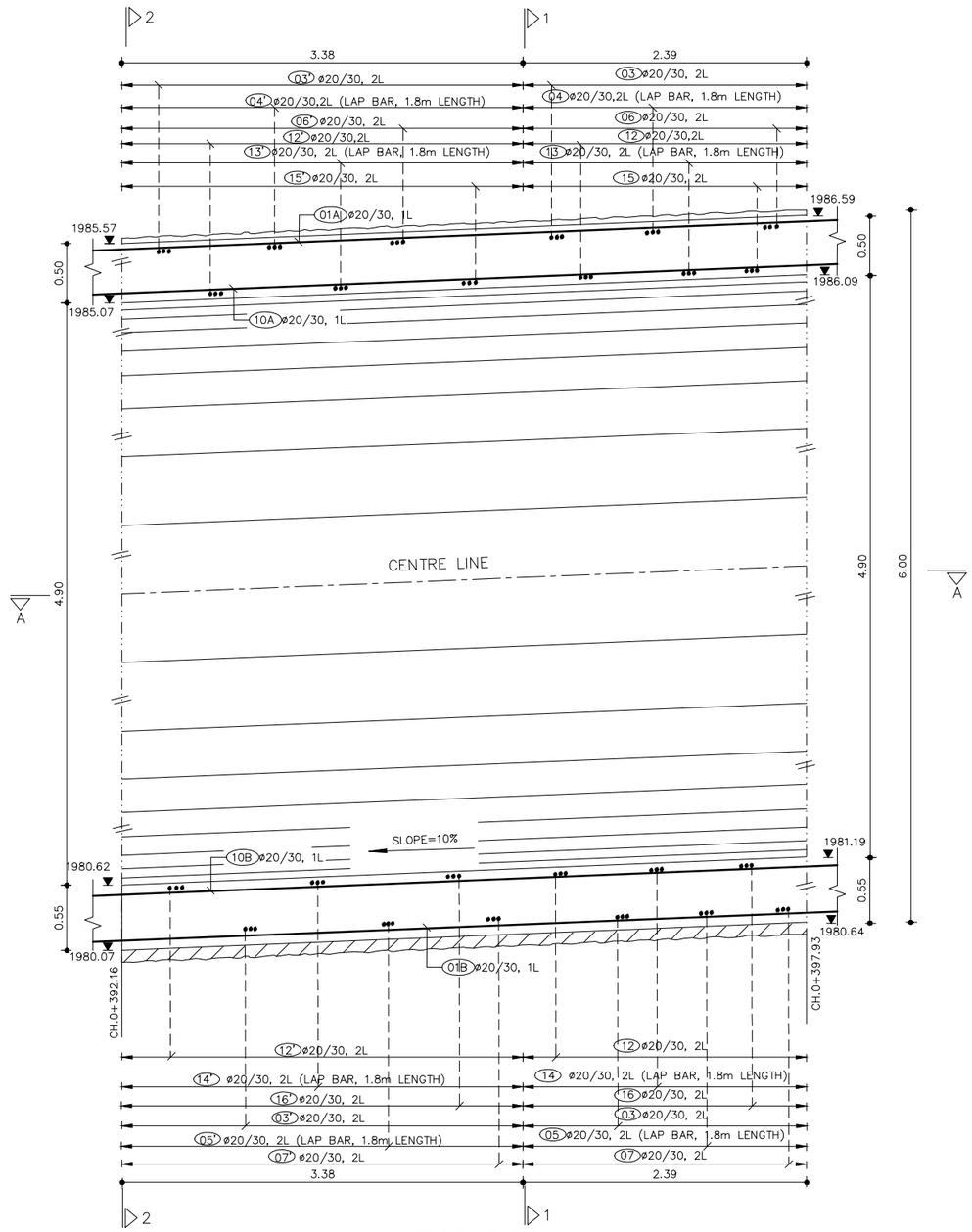
ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

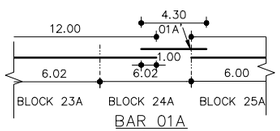
Contractor:				Drwg. Ref. :
	Cad. Sign.	Orig.Sign.	Date	SURGE TUNNEL
Drawn	Jan Jiwan		05.03.2019	CONCRETE LINING
Checked	S. Gautam			BLOCK 24A
Verified				CH.0+392.16~CH.0+397.93
Approved	Sheng D.F.			REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

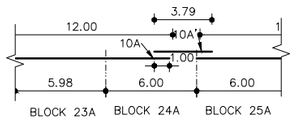
Drwg. No.: UTK-032064-ST-CL- R-2403 REV.



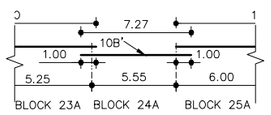
SECTION B–B
BLOCKS 24A
SCALE 1:25



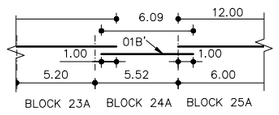
BAR 01A
ø20/30, 1L



BAR 10A
ø20/30, 1L



BAR 10B
ø20/30, 1L



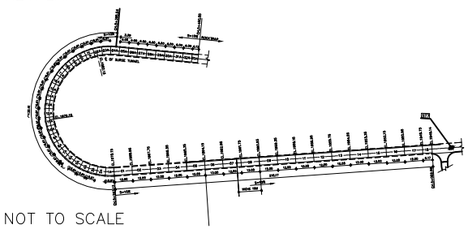
BAR 01B
ø20/30, 1L

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01A Rev–A for block plan.

LEGEND:
–//–//– Construction Joint
Coupler

SCALE 1:25
–0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
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UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:				Drwg. Ref. :
	Cad. Sign.	Orig.Sign.	Date	SURGE TUNNEL
Drawn	Jan Jiwan		05.03.2019	CONCRETE LINING
Checked	S. Gautam			BLOCK 24A
Verified				CH.0+392.16~CH.0+397.93
Approved	Sheng D.F.			REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50
Drwg. No.: UTK–032064–ST–CL– R–2404 REV.

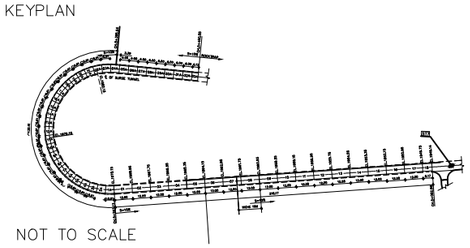
REINFORCEMENT CALCULATION OF BLOCK 24A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01A'	20	430 R=3710.00 ∠=19.00°	430	31	31 nos of laps	133.30	2.47	329.25	1	329.25	30cm SPACING
01B'	20	609 R=3710.00 ∠=19.00°	609	30	30 nos of laps	182.70	2.47	451.27	1	451.27	30cm SPACING
02	20	905 R=288.00 ∠=179.00°	905	08		72.40	2.47	178.83	1	178.83	30cm SPACING
02'	20	905 R=288.00 ∠=179.00°	905	12		108.60	2.47	268.24	1	268.24	30 cm SPACING
03	20	905 R=288.00 ∠=179.00°	905	08		72.40	2.47	178.83	1	178.83	30cm SPACING
03'	20	905 R=288.00 ∠=179.00°	905	12		108.60	2.47	268.24	1	268.24	30 cm SPACING
04	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
04'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING
05	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57		35.57	LAP BAR 30cm SPACING
05'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING
06	20	905 R=288.00 ∠=179.00°	905	08		72.40	2.47	178.83	1	178.83	30cm SPACING
06'	20	905 R=288.00 ∠=179.00°	905	12		108.60	2.47	268.24	1	268.24	30 cm SPACING
07	20	905 R=288.00 ∠=179.00°	905	08		72.40	2.47	178.83	1	178.83	30cm SPACING
07'	20	905 R=288.00 ∠=179.00°	905	12		108.60	2.47	268.24	1	268.24	30cm SPACING

REINFORCEMENT CALCULATION OF BLOCK 24A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
08	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57	1	35.57	30cm SPACING
08'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	30 cm SPACING
09	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
09'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING
10A	20	1200 R=4266.00 ∠=24.00°	1200	28	28 nos of laps	336.00	2.47	829.92	1	829.92	30cm SPACING
10A'	20	379 R=4266.00 ∠=24.00°	379	28	28 nos of laps	106.12	2.47	262.11	1	262.11	30cm SPACING
10B'	20	727 R=3745.00 ∠=18.00°	727	27	27 nos of laps	196.29	2.47	484.83	1	484.83	30cm SPACING
11	20	795 R=253.00 ∠=179.00°	795	08		63.60	2.47	157.09	1	157.09	30cm SPACING
11'	20	811 R=258.30 ∠=179.00°	811	12		97.32	2.47	240.38	1	240.38	30 cm SPACING
12	20	795 R=253.00 ∠=179.00°	795	08		63.60	2.47	157.09	1	157.09	30cm SPACING
12'	20	811 R=258.30 ∠=179.00°	811	12		97.32	2.47	240.38	1	240.38	30cm SPACING
13	20	180 R=253.00 ∠=40.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
13'	20	180 R=258.30 ∠=40.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING
14	20	180 R=253.00 ∠=40.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
14'	20	180 R=258.30 ∠=40.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:				Drwg. Ref. :
	Cad. Sign.	Orig.Sign.	Date	SURGE TUNNEL
Drawn	Jan Jiwan		05.03.2019	CONCRETE LINING
Checked	S. Gautam			BLOCK 24A
Verified				CH.0+392.16~CH.0+397.93
Approved	Sheng D.F.			REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE | Drwg. No.: UTK-032064-ST-CL- BS-2401 | REV.

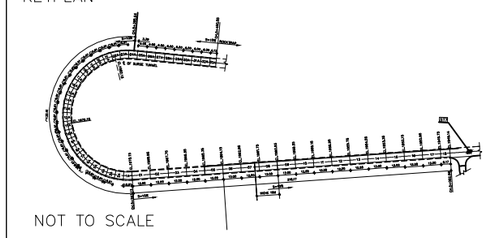
REINFORCEMENT CALCULATION OF BLOCK 24A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
15		795 R=253.00 ∠=179.00°	795	08		63.60	2.47	157.09	1	157.09	30cm SPACING
15'		811 R=258.30 ∠=179.00°	811	12		97.32		240.38	1	240.38	30 cm SPACING
16		795 R=253.00 ∠=179.00°	795	08		63.60	2.47	157.09	1	157.09	30cm SPACING
16'		811 R=258.30 ∠=179.00°	811	12		97.32	2.47	240.38	1	240.38	30 cm SPACING
17	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
17'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING
18	20	180 R=288.00 ∠=36.00°	180	08		14.40	2.47	35.57	1	35.57	LAP BAR 30cm SPACING
18'	20	180 R=288.00 ∠=36.00°	180	12		21.60	2.47	53.35	1	53.35	LAP BAR 30cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCK 24A

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	6446..90	144	–	–	355.68	–	–	6091.22
Total	6446.90							6091.22

KEYPLAN



NOT TO SCALE

Reference Drawings

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UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

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UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL

CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor: Drwg. Ref. :

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

SURGE TUNNEL
CONCRETE LINING
BLOCK 24A
CH.0+392.16~CH.0+397.93
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE | Drwg. No.: UTK–032064–ST–CL– BS–2402 | REV.

NOTES:
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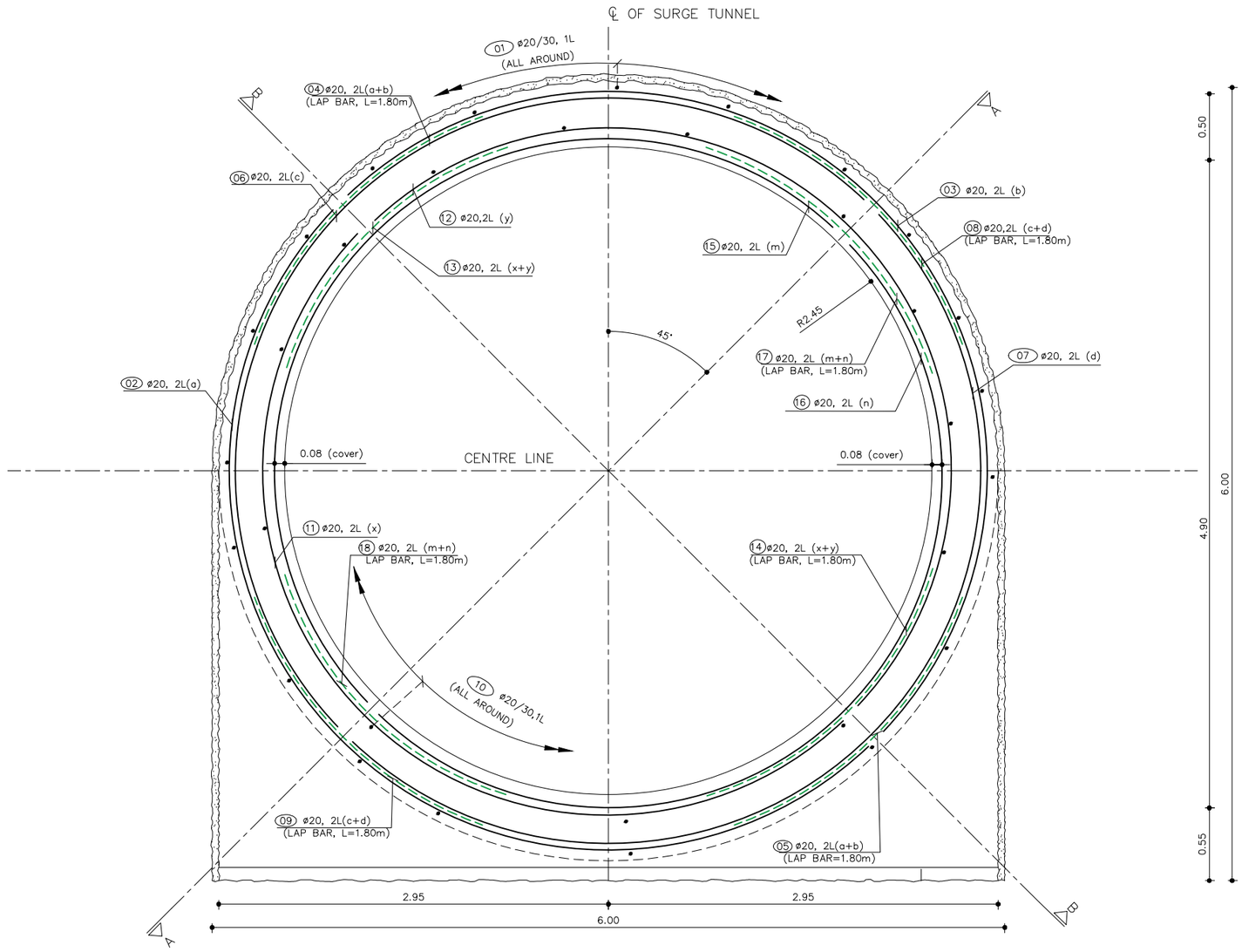
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

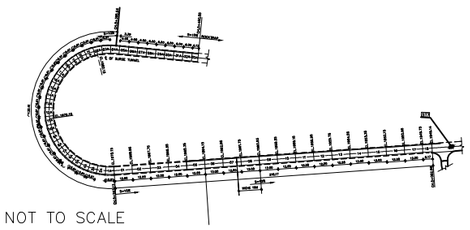
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 25A~32A
SCALE 1:20

SCALE 1:20
-0.20 0 0.20 0.40 0.60 0.80 1.00 [m]

KEYPLAN



NOT TO SCALE

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ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

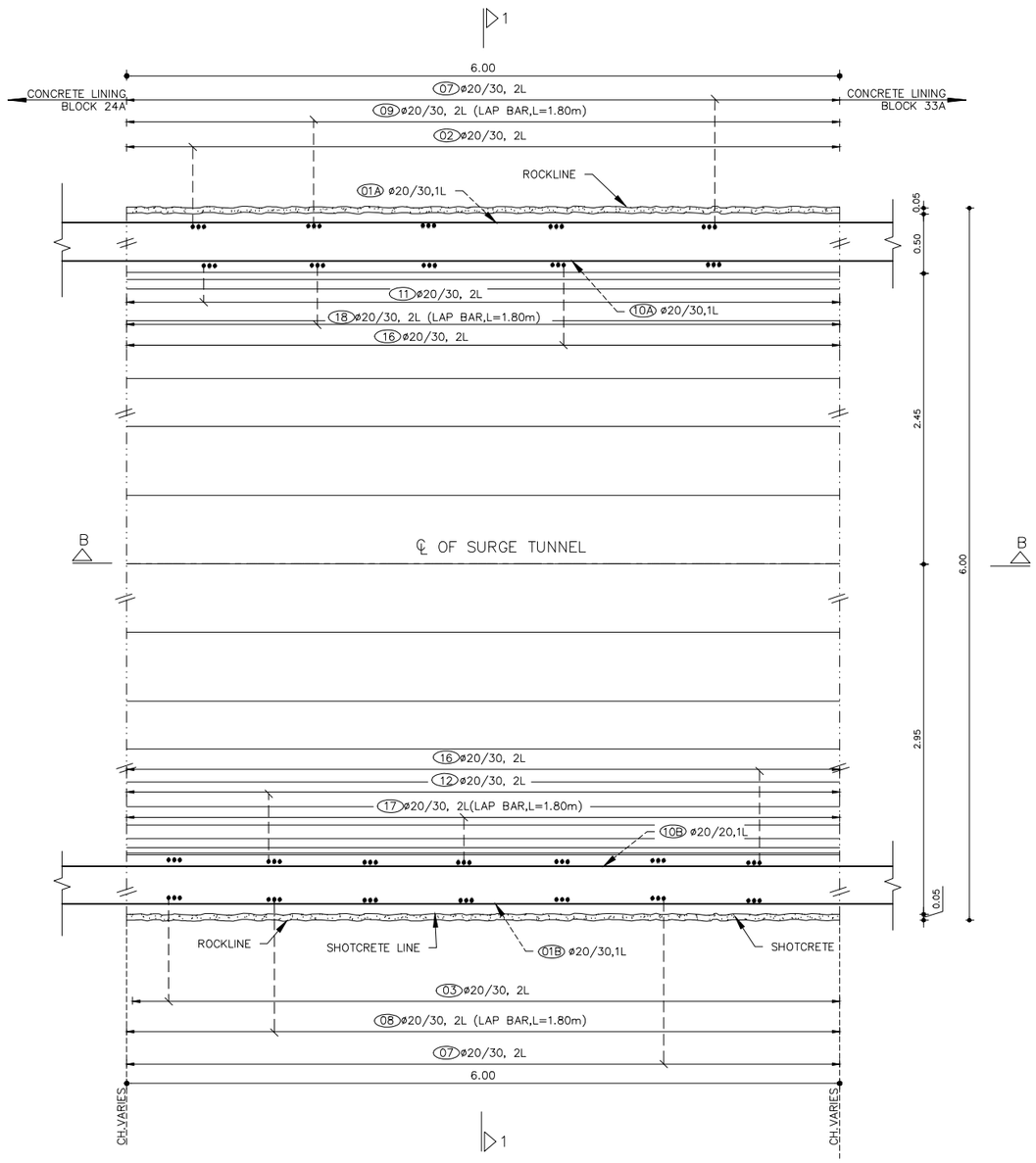
SURGE TUNNEL
CONCRETE LINING
BLOCK 25A~32A
CH.0+397.93~CH.0+445.93
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-2501 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

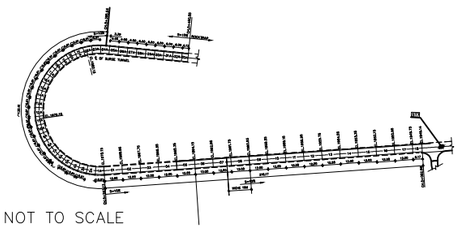
LEGEND:
-//-//- Construction Joint
Coupler



SECTION A-A
BLOCK 25A~32A
SCALE 1:25

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

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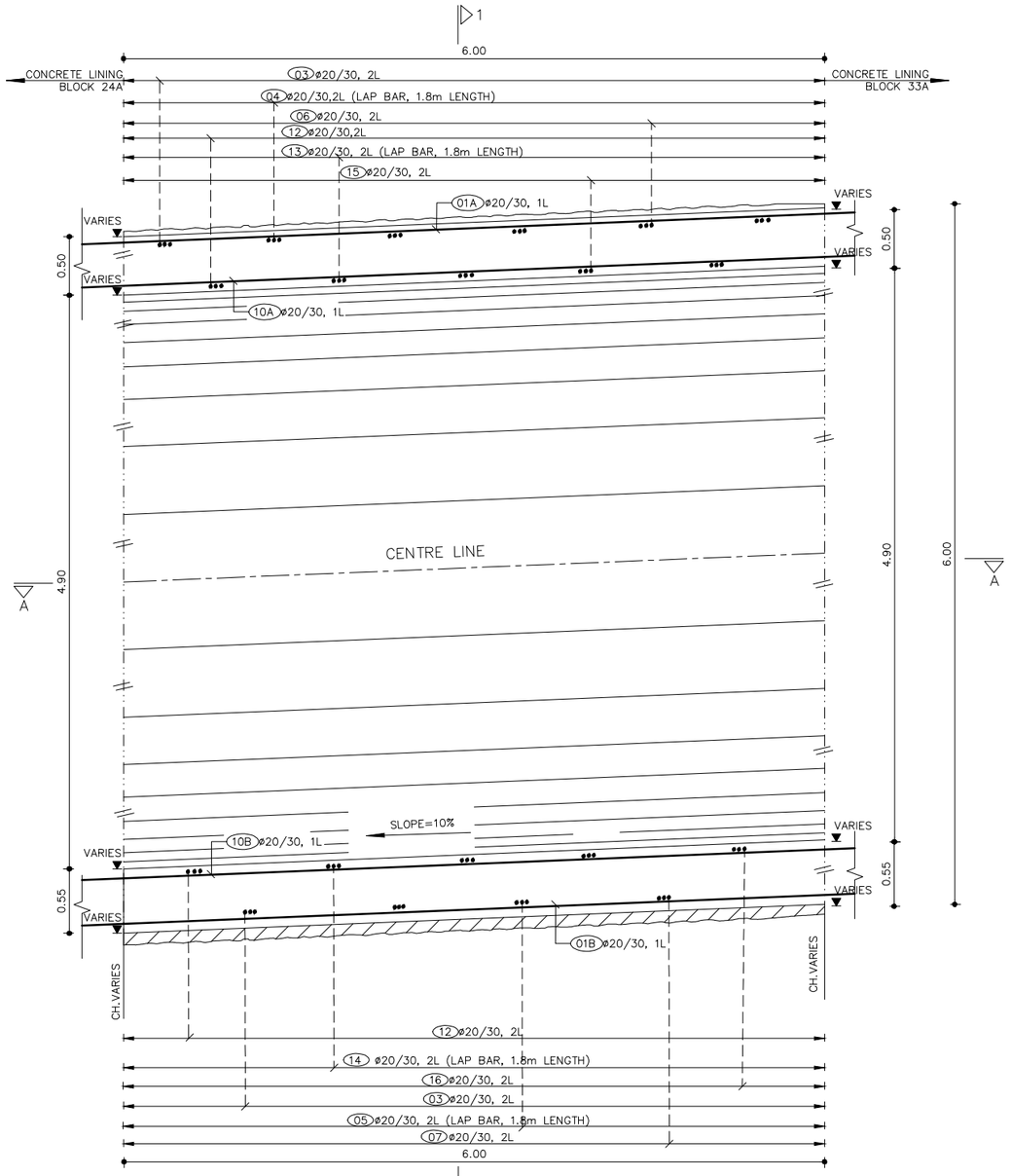
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 25A~32A
CH.0+397.93~CH.0+445.93
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK-032064-ST-CL- R-2502 REV.



SECTION B–B
BLOCKS 25A~32A
SCALE 1:25

NOTES:

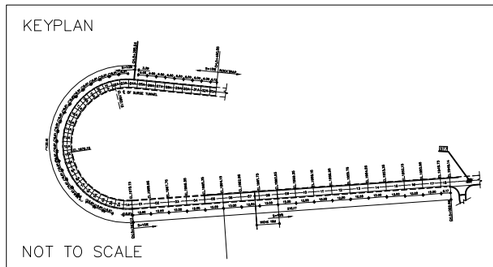
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01A Rev–A for block plan.

LEGEND:

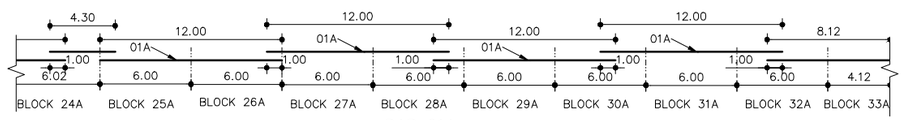
–//–//– Construction Joint
——■—— Coupler

SCALE 1:25
–0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

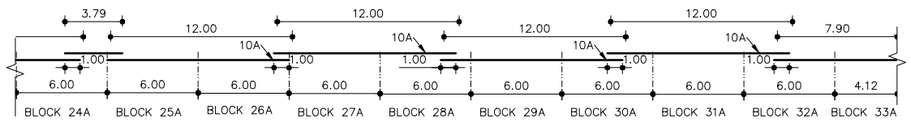
KEYPLAN



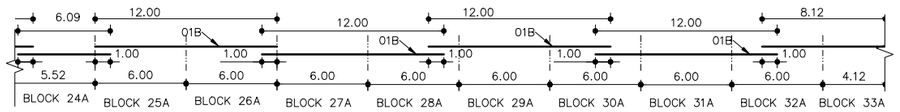
NOT TO SCALE



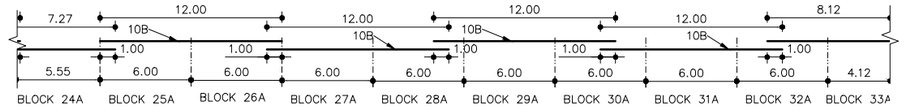
BAR 01A
ø20/30, 1L



BAR 10A
ø20/30, 1L



BAR 01B
ø20/30, 1L



BAR 10B
ø20/30, 1L

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

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Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 25A~32A
CH.0+397.93~CH.0+445.93
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK–032064–ST–CL– R–2503 REV.

REINFORCEMENT CALCULATION OF BLOCK 25A~32A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01A	20	12.00	1200	4*31	4*31 nos of laps	1488.00	2.47	3675.36	–	3675.36	30cm SPACING
01B	20	12.00	1200	4*30	4*30 nos of laps	1440.00	2.47	3556.80	–	3556.80	30cm SPACING
02	20	905 R=288.00 ∠=179.00°	905	20		181.00	2.47	447.07	08	3576.56	30cm SPACING
03	20	905 R=288.00 ∠=179.00°	905	20		181.00	2.47	4447.07	08	3576.56	30cm SPACING
04	20	180 R=288.00 ∠=36.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
05	20	180 R=288.00 ∠=36.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
06	20	905 R=288.00 ∠=179.00°	905	20		181.00	2.47	447.07	08	3576.56	30cm SPACING
07	20	905 R=288.00 ∠=179.00°	905	20		181.00	2.47	447.07	08	3576.56	30cm SPACING
08	20	180 R=288.00 ∠=36.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
09	20	180 R=288.00 ∠=36.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
10A	20	12.00	1200	4*28	4*28 nos of laps	1344.00	2.47	3319.68	–	3319.68	30cm SPACING
10B	20	12.00	1200	4*27	4*27 nos of laps	1296.00	2.47	3201.12	–	3201.12	30cm SPACING

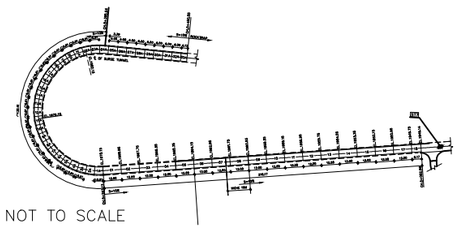
REINFORCEMENT CALCULATION OF BLOCK 25A~32A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11	20	795 R=253.00 ∠=179.00°	795	20		159.00	2.47	392.73	08	3141.84	30cm SPACING
12	20	795 R=253.00 ∠=179.00°	795	20		159.00	2.47	392.73	08	3141.84	30cm SPACING
13	20	180 R=253.00 ∠=40.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
14	20	180 R=253.00 ∠=40.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
15	20	795 R=253.00 ∠=179.00°	795	20		159.00	2.47	392.73	08	3141.84	30cm SPACING
16	20	795 R=253.00 ∠=179.00°	795	20		159.00	2.47	392.73	08	3141.84	30cm SPACING
17	20	180 R=253.00 ∠=40.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING
18	20	180 R=253.00 ∠=40.00°	180	20		36.00	2.47	88.92	08	711.36	LAP BAR 30cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCKS 25A~32A

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	46317.44	464	–	–	1146.08	–	–	45171.36
Total	46317.44							45171.36

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

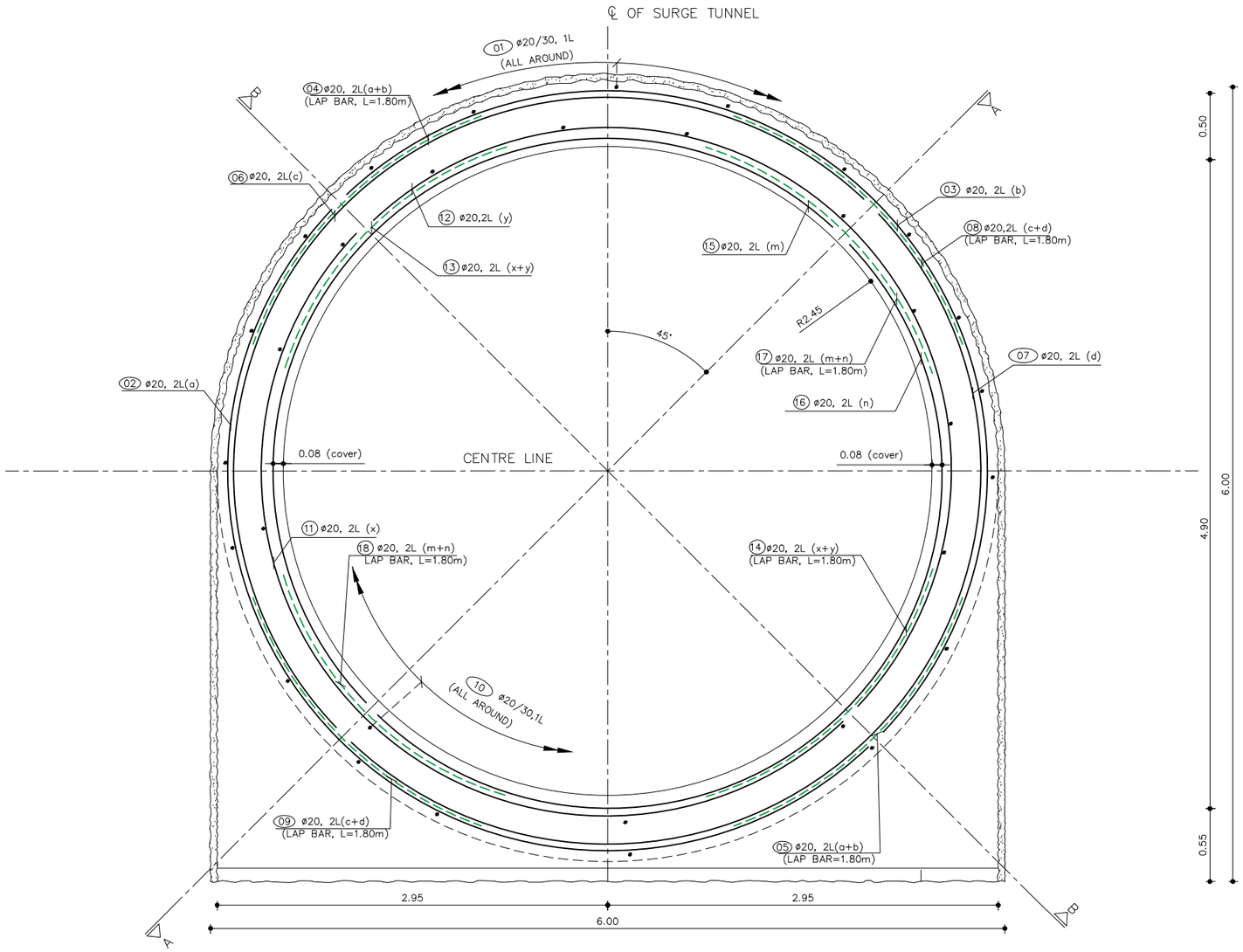
SURGE TUNNEL
CONCRETE LINING
BLOCK 25A~32A
CH.0+397.93~CH.0+445.93
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE

Drwg. No.: UTK–032064–ST–CL– BS–2501 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

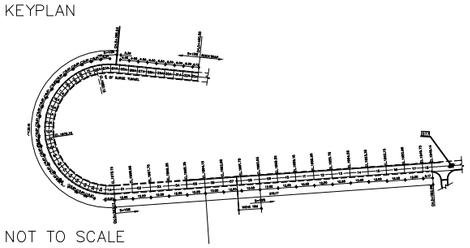
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 33A
SCALE 1:20

SCALE 1:20
-0.20 0 0.20 0.40 0.60 0.80 1.00 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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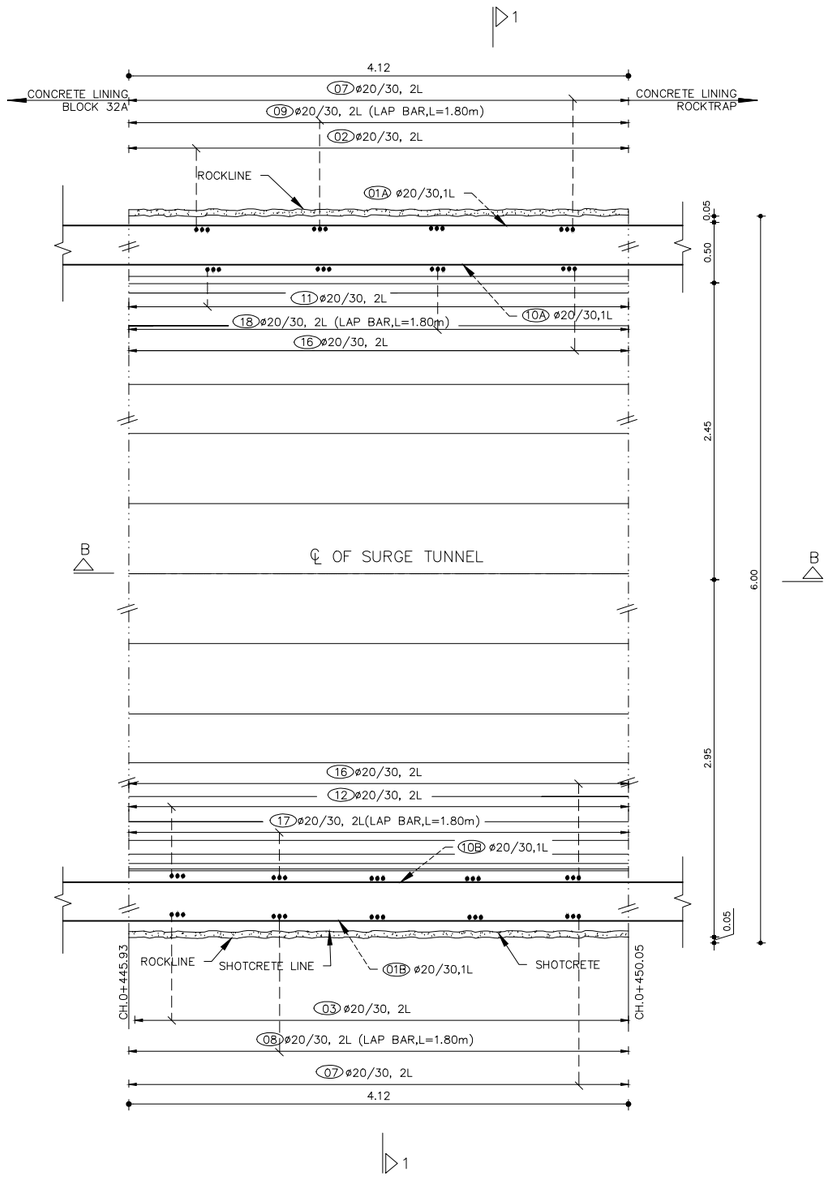
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 33A
CH.0+445.93~CH.0+450.05
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40
Drwg. No.: UTK-032064-ST-CL- R-3301 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

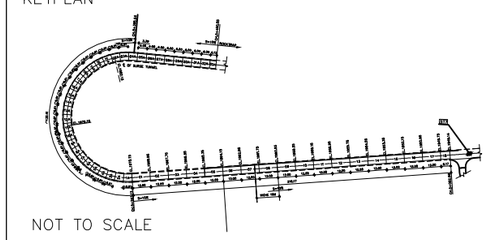
LEGEND:
-//-//- Construction Joint
Coupler



SECTION A-A
BLOCK 33A
SCALE 1:25

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
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Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

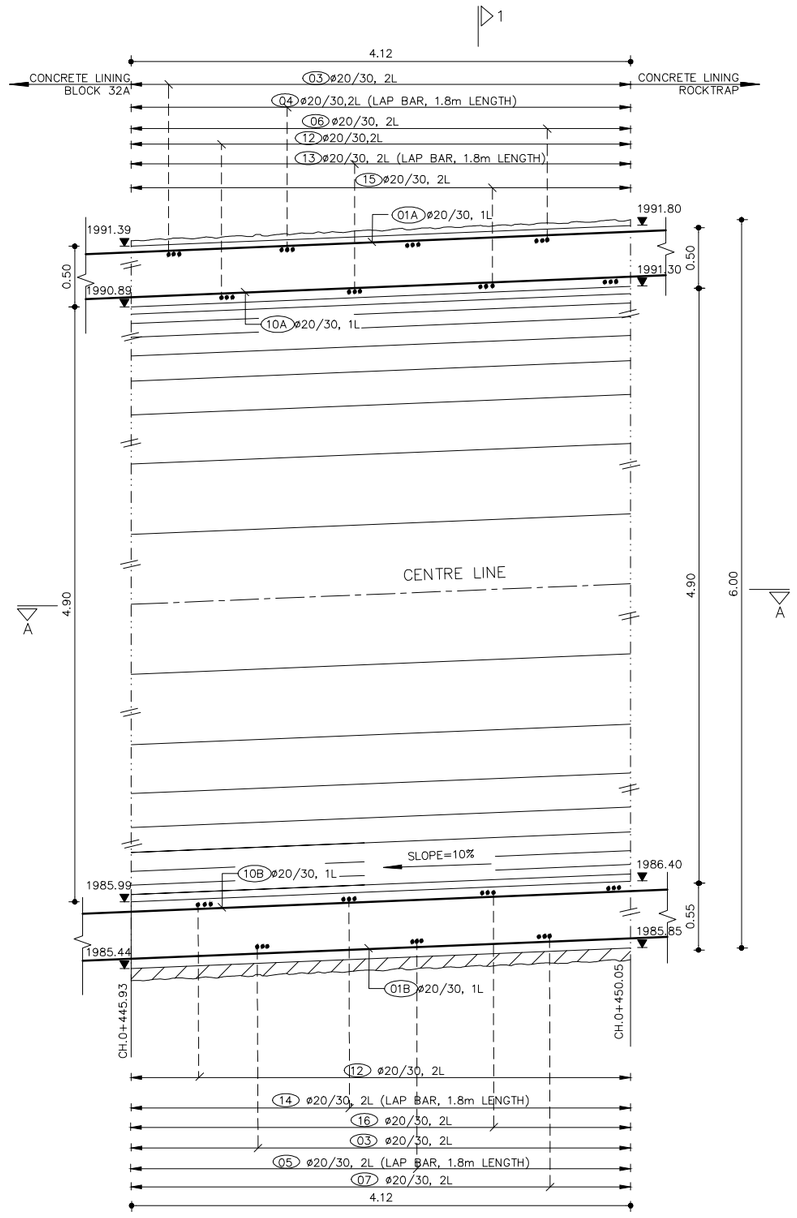
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 33A
CH.0+445.93~CH.0+450.05
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

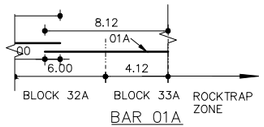
Drwg. No.: UTK-032064-ST-CL- R-3302 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

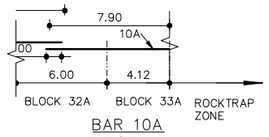
LEGEND:
—//—//— Construction Joint
—■— Coupler



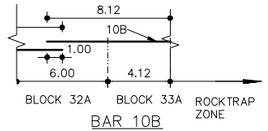
SECTION B-B
BLOCKS 33A
SCALE 1:25



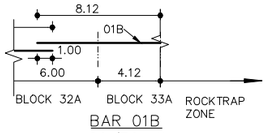
BAR 01A
ø20/30, 1L



BAR 10A
ø20/30, 1L



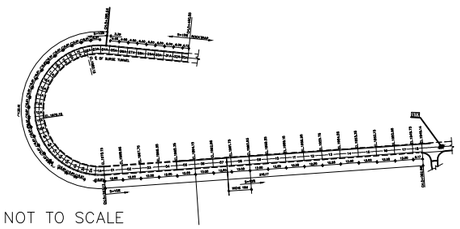
BAR 10B
ø20/30, 1L



BAR 01B
ø20/30, 1L

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
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UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

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Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:				Drwg. Ref. :
	Cad. Sign.	Orig.Sign.	Date	SURGE TUNNEL
Drawn	Jan Jiwan		05.03.2019	CONCRETE LINING
Checked	S. Gautam			BLOCK 33A
Verified				CH.0+445.93~CH.0+450.05
Approved	Sheng D.F.			REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50
Drwg. No.: UTK-032064-ST-CL- R-3303 REV.

REINFORCEMENT CALCULATION OF BLOCK 33A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01A	20	812	812	31	31 nos of laps	251.72	2.47	621.75	–	621.75	30cm SPACING
01B	20	812	812	30	30 nos of laps	243.60	2.47	601.70	–	601.70	30cm SPACING
02	20	905 R=288.00 ∠=179.00°	905	14		126.70	2.47	312.95	01	312.95	30cm SPACING
03	20	905 R=288.00 ∠=179.00°	905	14		126.70	2.47	312.95	01	312.95	30cm SPACING
04	20	180 R=288.00 ∠=36.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
05	20	180 R=288.00 ∠=36.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
06	20	905 R=288.00 ∠=179.00°	905	14		126.70	2.47	312.95	01	312.95	30cm SPACING
07	20	905 R=288.00 ∠=179.00°	905	14		126.70	2.47	312.95	01	312.95	30cm SPACING
08	20	180 R=288.00 ∠=36.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
09	20	180 R=288.00 ∠=36.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
10A	20	790	790	28	28 nos of laps	221.20	2.47	546.36	–	546.36	30cm SPACING
10B	20	812	812	27	27 nos of laps	219.24	2.47	541.52	–	541.52	30cm SPACING

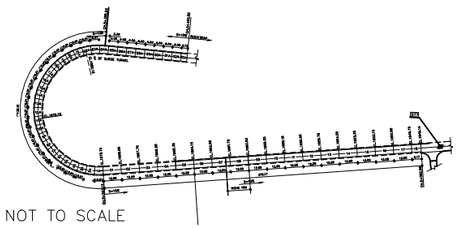
REINFORCEMENT CALCULATION OF BLOCK 33A

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11	20	795 R=253.00 ∠=179.00°	795	14		111.30	2.47	274.91	01	274.91	30cm SPACING
12	20	795 R=253.00 ∠=179.00°	795	14		111.30	2.47	274.91	01	274.91	30cm SPACING
13	20	180 R=253.00 ∠=40.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
14	20	180 R=253.00 ∠=40.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
15	20	795 R=258.30 ∠=179.00°	795	14		111.30	2.47	274.91	01	274.91	30cm SPACING
16	20	795 R=258.30 ∠=179.00°	795	14		111.30	2.47	274.91	01	274.91	30cm SPACING
17	20	180 R=258.30 ∠=40.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING
18	20	180 R=258.30 ∠=40.00°	180	14		25.20	2.47	62.24	01	62.24	LAP BAR 30cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCKS 33A

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	5160.69	116	–	–	286.52	–	–	4874.17
Total	5160.69							4874.17

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL | CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

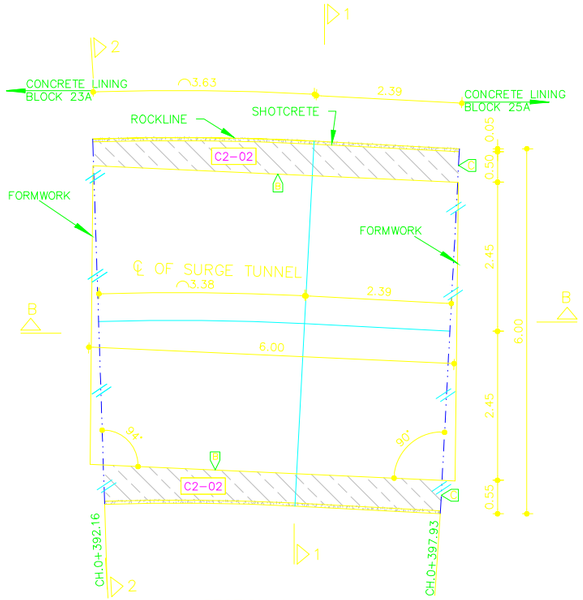
Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

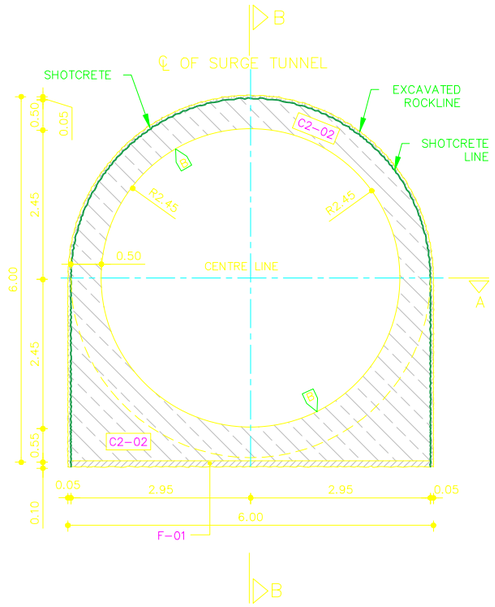
Drwg. Ref. :

SURGE TUNNEL
CONCRETE LINING
BLOCK 33A
CH.0+445.93~CH.0+450.05
REINFORCEMENT EXECUTION DRAWING

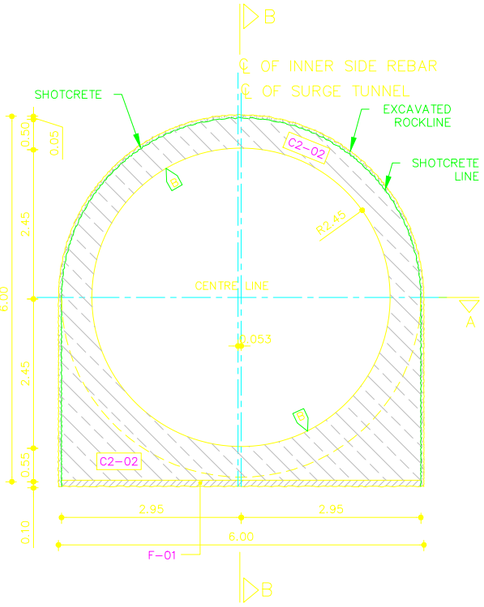
NOT TO SCALE | Drwg. No.: UTK-032064-ST-CL- BS-3301 | REV.



SECTION A-A
BLOCK 24A
SCALE 1:50



SECTION 1-1
BLOCKS 24A
SCALE 1:50



SECTION 2-2
BLOCK 24A
SCALE 1:50

NOTES:

1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Concrete cover is 8 cm.
4. For Block Plan Refer UTK-032064-ST-CL-BP-01 REV.A.
5. F-01 Quantity As Per Site.

LEGEND:

Construction Joint

ABBREVIATION:

E - 01
- CONCRETE PLACEMENT SEQUENCE
- CONCRETE CLASS

F — BLINDING CONCRETE C12/15

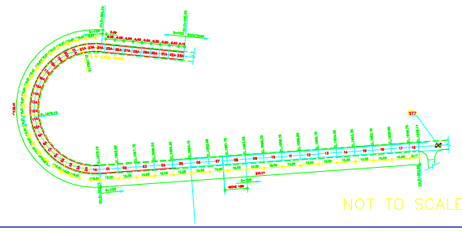
C2 — CONCRETE C30/37

C — SCREEDED FINISH CONCEALED FROM VIEW

B — EXPOSED TO VIEW OR FLOWING WATER

SCALE 1:50
-0.50 0 0.50 1.00 1.50 2.00 2.50 [m]

KEYPLAN



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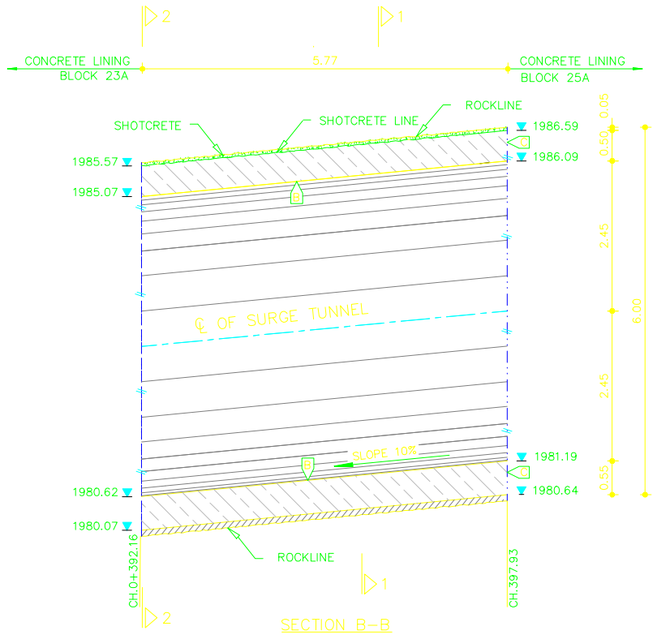


SECTION B-B
BLOCK 24A
SCALE 1:50

FORMWORK CALCULATION FOR BLOCK 24A

CONCRETE CLASS - PLACEMENT NO.	FINISHING CLASS	FORM WORK						REMARK
		LENGTH(m)	HEIGHT(m)	NOS	AREA (m2)	NO. OF BLOCK	TOTAL AREA (m2)	
C2 - 02	B	15.39	6.00	1.00	92.34	1	92.34	CIRCUMFERENCE=15.39m
	C	12.51		1.00	12.51	1	12.51	X-AREA=12.51 m2

CONCRETE FEATURES FOR BLOCK 24A

CONCRETE CLASS-PLACEMENT NO.	CONCRETE									REMARK
	LENGTH(m)	BREADTH(m)	HEIGHT(m)	CALC. VOLUME (m3)	ADDED VOLUME (m3)	DEDUCTED VOLUME (m3)	ACTUAL VOLUME (m3)	NO. OF BLOCK	TOTAL VOLUME (m3)	
C2 - 02	6.00	12.51		75.06	0.00	0.00	75.06	1	75.06	X-AREA=12.51 m2

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

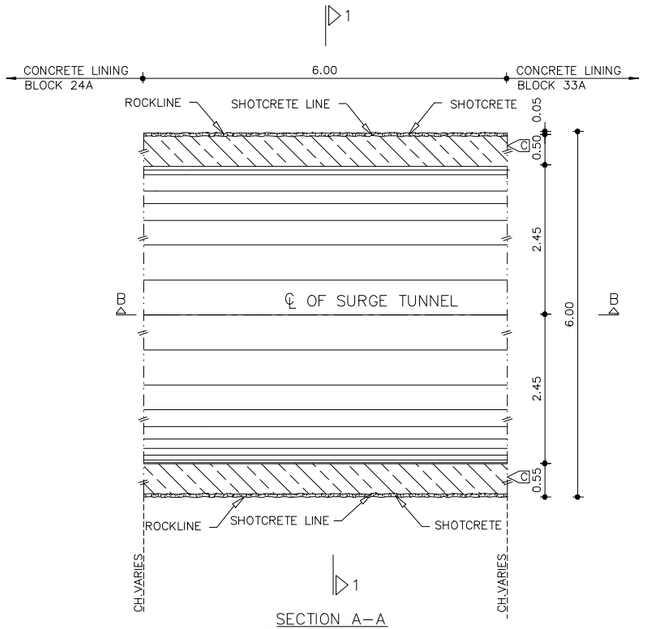
	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

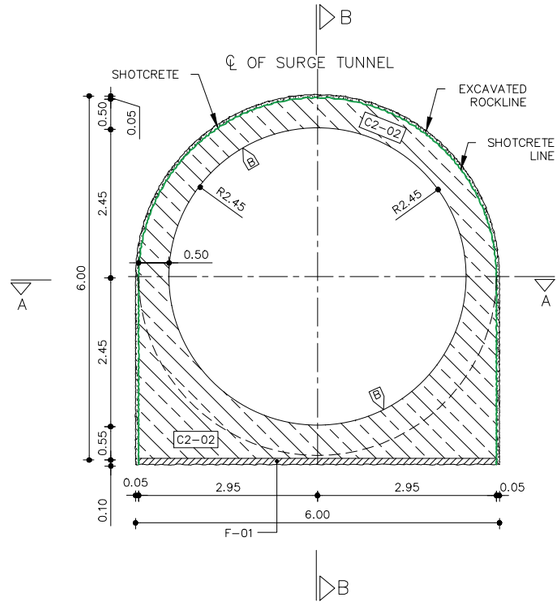
SURGE TUNNEL
CONCRETE LINING
BLOCK 24A
CH.0+392.16~CH.0+397.93
FORMWORK EXECUTION DRAWING

Scale A1 1:50
Scale A3 1:100

Drwg. No.: UTK-032064-ST-CL- C-2401 REV.



SECTION A–A
BLOCK 25A~32A
SCALE 1:50



SECTION 1–1
BLOCKS 25A~32A
SCALE 1:50

NOTES:

1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Concrete cover is 8 cm.
4. For Block Plan Refer UTK–032064–ST–CL–BP–01 REV.A.
5. F–01 Quantity As Per Site.

LEGEND:

—//—//— Construction Joint

ABBREVIATION:

E – 01
- 01 — CONCRETE PLACEMENT SEQUENCE
- E — CONCRETE CLASS

F — BLINDING CONCRETE C12/15

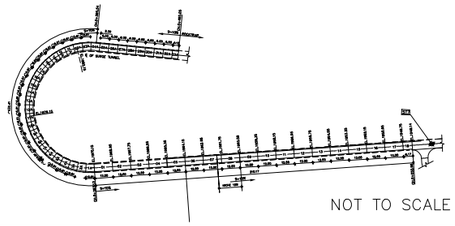
C2 — CONCRETE C30/37

C — SCREEDED FINISH CONCEALED FROM VIEW

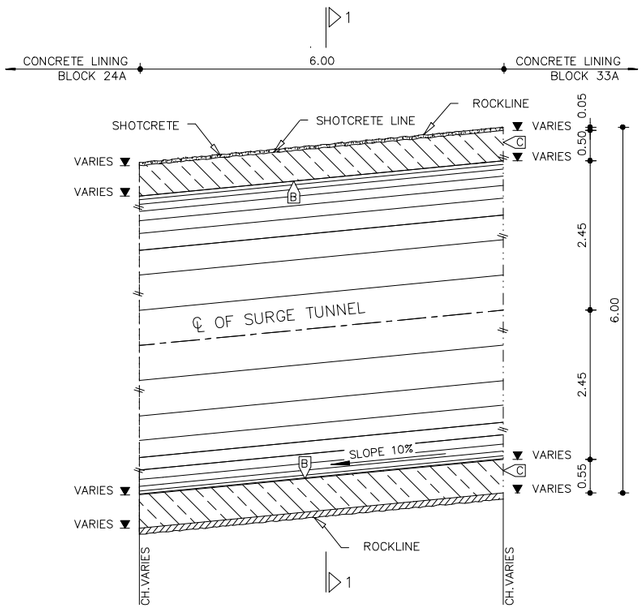
B — EXPOSED TO VIEW OR FLOWING WATER

SCALE 1:50
–0.50 0 0.50 1.00 1.50 2.00 2.50 [m]

KEYPLAN



NOT TO SCALE



SECTION B–B
BLOCK 25A~32A
SCALE 1:50

FORMWORK CALCULATION FOR BLOCK 25A~32A								
CONCRETE CLASS – PLACEMENT NO.	FINISHING CLASS	FORM WORK						REMARK
		LENGTH(m)	HEIGHT(m)	NOS	AREA (m2)	NO. OF BLOCK	TOTAL AREA (m2)	
C2 – 02	B	15.39	6.00	1.00	92.34	8	738.72	CIRCUMFERENCE=15.39m
	C	12.51		1.00	12.51	8	100.08	X–AREA=12.51 m2

CONCRETE FEATURES FOR BLOCK 25A~32A										
CONCRETE CLASS– PLACEMENT NO.	CONCRETE									REMARK
	LENGTH(m)	BREADTH(m)	HEIGHT(m)	CALC. VOLUME (m3)	ADDED VOLUME (m3)	DEDUCTED VOLUME (m3)	ACTUAL VOLUME (m3)	NO. OF BLOCK	TOTAL VOLUME (m3)	
C2 – 02	6.00	12.51		75.06	0.00	0.00	75.06	8	600.48	X–AREA=12.51 m2

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

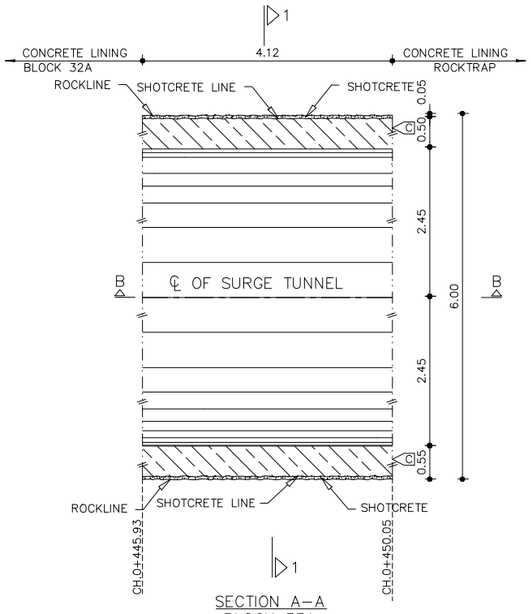
	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

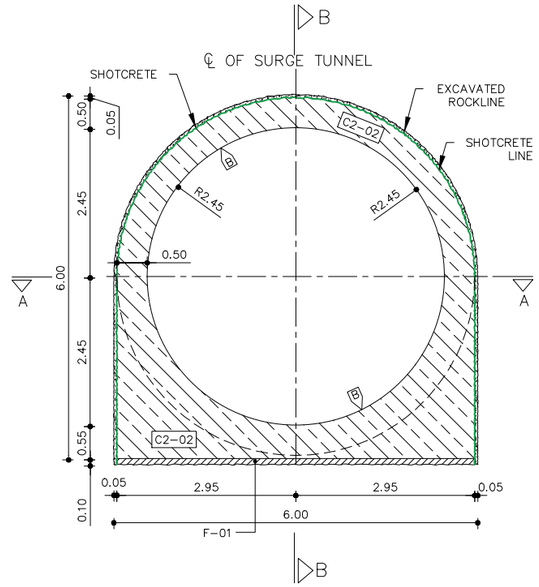
SURGE TUNNEL
CONCRETE LINING
BLOCK 25A~32A
CH.0+397.93~CH.0+445.93
FORMWORK EXECUTION DRAWING

Scale A1 1:50
Scale A3 1:100

Drwg. No.: UTK–032064–ST–CL– C–2501 REV.



SECTION A–A
BLOCK 33A
SCALE 1:50



SECTION 1–1
BLOCKS 33A
SCALE 1:50

NOTES:

1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Concrete cover is 8 cm.
4. For Block Plan Refer UTK–032064–ST–CL–BP–01 REV.A.
5. F–01 Quantity As Per Site.

LEGEND:

—//—//— Construction Joint

ABBREVIATION:

F – 01
- 01: CONCRETE PLACEMENT SEQUENCE
- F: CONCRETE CLASS

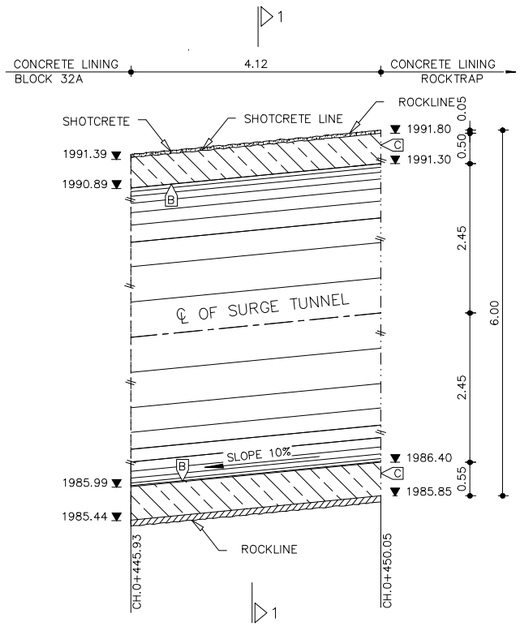
F — BLINDING CONCRETE C12/15

C2 — CONCRETE C30/37

C — SCREEDED FINISH CONCEALED FROM VIEW

B — EXPOSED TO VIEW OR FLOWING WATER

SCALE 1:50
–0.50 0 0.50 1.00 1.50 2.00 2.50 [m]

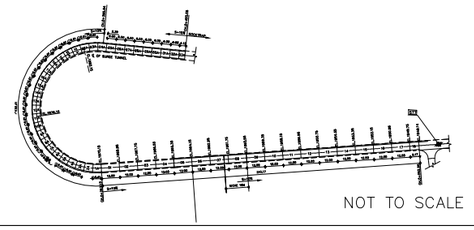


SECTION B–B
BLOCK 33A
SCALE 1:50

FORMWORK CALCULATION FOR BLOCK 33A								
CONCRETE CLASS – PLACEMENT NO.	FINISHING CLASS	FORM WORK						REMARK
		LENGTH(m)	HEIGHT(m)	NOS	AREA (m2)	NO. OF BLOCK	TOTAL AREA (m2)	
C2 – 02	B	15.39	4.12	1.00	63.40	1	63.40	CIRCUMFERENCE=15.39m
	C	12.51		1.00	12.51	1	12.51	X–AREA=12.51 m2

CONCRETE FEATURES FOR BLOCK 33A										
CONCRETE CLASS–PLACEMENT NO.	CONCRETE									REMARK
	LENGTH(m)	BREADTH(m)	HEIGHT(m)	CALC. VOLUME (m3)	ADDED VOLUME (m3)	DEDUCTED VOLUME (m3)	ACTUAL VOLUME (m3)	NO. OF BLOCK	TOTAL VOLUME (m3)	
C2 – 02	4.12	12.51		51.54	0.00	0.00	51.54	1	51.54	X–AREA=12.51 m2

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
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Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
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UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		05.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 33A
CH.0+445.93~CH.0+450.05
FORMWORK EXECUTION DRAWING

Scale A1 1:50
Scale A3 1:100

Drwg. No.: UTK–032064–ST–CL– C–3301 REV.